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PATENTS
8026-1008

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of: Appeal No. _____

Toshiya SHIMURA et al. Confirmation No. 7580

Serial No. 09/973,762 GROUP 2643

Filed October 11, 2001 Examiner Barry W. Taylor

METHOD OF MEASURING AND IMPROVING
XDSL TRANSMISSION CHARACTERISTIC

APPEAL BRIEF

MAY IT PLEASE YOUR HONORS: December 30, 2005

(i) **Real Party in Interest**

The real party in interest in this appeal is the Assignee, NEC Corporation of Tokyo, Japan.

(ii) **Related Appeals and Interferences**

Neither the appellants, appellants' legal representative nor the assignee know of any other prior or pending appeals, interferences or judicial proceedings which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(iii) **Status of the Claims**

Claims 1-8, 11-12, 14, and 17-20 are pending. Claims 9-10, 13, 15, and 16 have been cancelled.

iv) **Status of Amendments**

There have been no amendments since the final rejection of the claims by the Official Action mailed June 8, 2005 (the "OA"). The claims are as set forth in the attached Claims Appendix.

(v) **Summary of Claimed Subject Matter**

Independent claims 1 and 3.

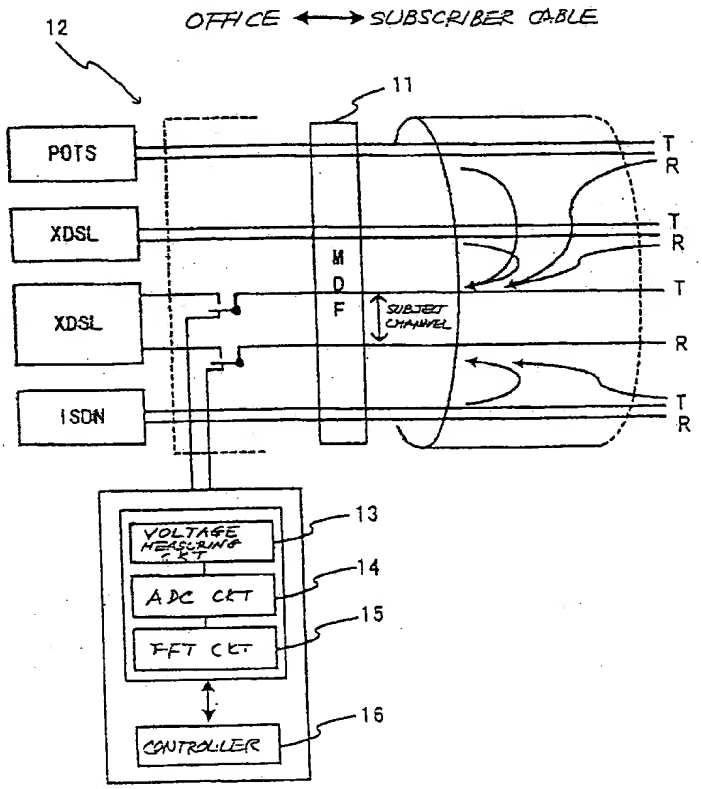
Claims 1 and 3 respectively recite a method and a system of improving/measuring a transmission characteristic of an xDSL system that implements high-speed data communication over existing copper telephone line wires connecting a telephone office and a subscriber.

The inventive method/system makes a voltage measurement to measure existing cross-talk, within only the xDSL transmission frequency band, to determine whether or not the subscriber line is usable within that frequency range delimited by xDSL use (published application paragraphs [0002], [0008], and [0013]-[0021]).

As claimed, the invention determines whether or not a subscriber line is usable within the frequency range

delimited by xDSL use by **measuring** a cross-talk noise characteristic of that subscriber telephone line **only within an xDSL transmission frequency band**, that cross-talk noise characteristic being cross-talk existing on the subscriber telephone line due to interference from other subscriber telephone lines **within the xDSL transmission frequency band.**

With reference to application Figure 2, reproduced below, the inventive system includes a polling means polling a subscriber side of an outside telephone line providing an xDSL circuit, a noise level measuring means, and a decision means.



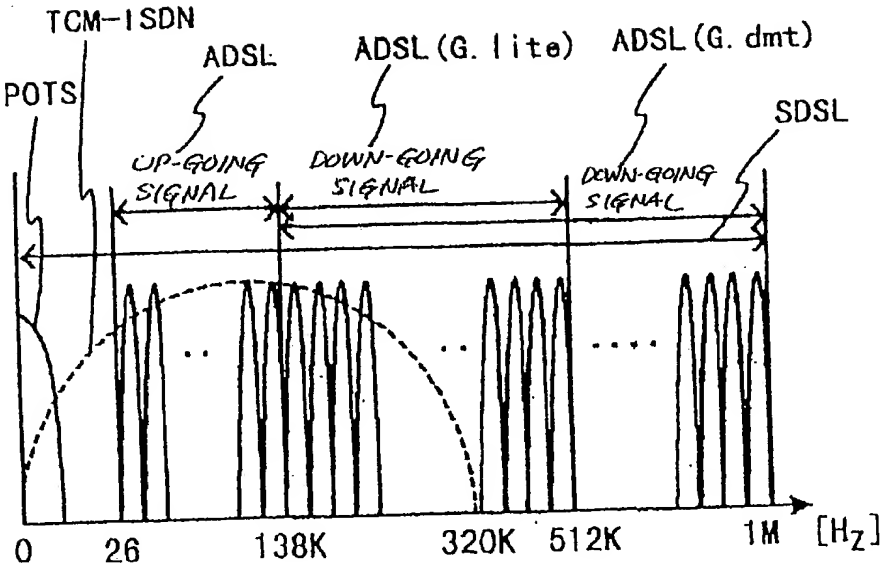
The polling means, as illustrated in Figure 2 and recited by dependent claim 4, comprises a Main Distribution

Frame (MDF 11) connecting terminals T and R of the outside telephone line to test terminals.

The noise level measuring means (13, 14, 15) measures an existing level of cross-talk noise on the subscriber line. Importantly, the noise level measurement is limited to an xDSL transmission frequency band, i.e., as recited by claim 1 "**to measure** a cross-talk noise characteristic of said subscriber telephone line **only within an xDSL transmission frequency band**". Also, as per claim 1, "the measured cross-talk characteristic is cross-talk existing on the subscriber telephone line due to interference from other subscriber telephone lines within the xDSL transmission frequency band."

A decision means (16) determines, based on the level of cross-talk noise measured, whether or not the subscriber line is usable **within the frequency range delimited by xDSL use** (claim 3). Claim 1 recites "if said cross-talk noise characteristic is of high level, preventing said subscriber telephone line from being connected to said xDSL circuit".

Application Figure 1 (reproduced below), as per published application paragraph [0011], shows specific frequency bands assigned to a DMT (Direct Multi-Tone) xDSL system and other communication systems.



As to claims 1 and 3, the focus of the appeal is on the recited features of:

1) measuring "a cross-talk noise characteristic of said subscriber telephone line **only** within an xDSL transmission frequency band", that characteristic being "cross-talk existing on the subscriber telephone line due to interference from other subscriber telephone lines within the xDSL transmission frequency band", and

2) determining "whether or not the subscriber line is usable within the frequency range **delimited** by xDSL use".

Independent Claim 17.

Independent claim 17 is more specific as to the noise level measuring means than claims 1 and 3, but also focuses on the cross-talk noise measurement, i.e., reciting a "noise level measuring means for measuring an existing

level of cross-talk noise on the subscriber line ascribable to first digital signal cross-talk noise within an overlapping frequency range of a first xDSL channel under test".

Claim 17 includes recitations detailing the noise level measuring means, i.e., comprising "**a voltage measuring circuit** for measuring an existing cross-talk noise voltage input via said relays, an ADC (Analog-to-Digital Converter) circuit for converting cross-talk noise voltage measured to a digital signal, and an FFT (Fast Fourier Transform) circuit for transforming the digital signal to noise spectrum data".

Dependent Claims 2, 5, and 7.

Claim 2 further recites "said measurement of the cross-talk is made without injecting a test signal onto the subscriber telephone line under test". As discussed above, the invention measures voltage in order to measure cross-talk. Therefore, no test signal is injected.

This is recited in claims 5 and 7 as:

"a voltage measuring circuit for measuring an existing cross-talk noise voltage input via said relays; an ADC (Analog-to-Digital Converter) circuit for converting cross-talk noise voltage measured to a digital signal; and an FFT (Fast Fourier Transform) circuit for transforming the digital signal to noise spectrum data".

(vi) **Grounds of Rejection to be Reviewed on Appeal**

Whether the rejection of claims 1-8, 11-12, 14 and 17-20 under §103 over KOEMAN et al. 5,731,706 ("KOEMAN") in view of VALENTI et al (US 2002/0041565, "VALENTI") was proper.

(vii) **Arguments**

Of VALENTI, Only VALENTI '734 is Prior Art

Published application VALENTI itself was filed on August 3, 2001, which is subsequent to the Japanese priority application date of October 11, 2000. VALENTI, however, claims priority to U.S. Provisional Applications 60/222,734, filed August 3, 2000 and 60/262,548, filed January 17, 2001.

The Examiner has acknowledged (OA page 7) that only the subject matter of U.S. 60/222,734 is prior art to the present application ("VALENTI '734").

A difficulty in this case has been the Examiner pointing to material in the published application VALENTI, without showing corresponding material in prior art provisional VALENTI '734. Any material from the published application VALENTI, but not disclosed in the provisional VALENTI '734 is not prior art and does not support any analysis as to obviousness. Indeed, the rejection is only

proper if the Examiner can rely solely on VALENTI '734.

Arguments Concerning the Rejection of Claims 1 and 3

Claims 1 and 3 require 1) measuring "a cross-talk noise characteristic of said subscriber telephone line **only within an xDSL transmission frequency band**", that noise characteristic being "cross-talk existing on the subscriber telephone line due to interference from other subscriber telephone lines **within the xDSL transmission frequency band**", and 2) determining "whether or not the subscriber line is usable **within the frequency range delimited by xDSL use**".

By re-ordering these claim recitations, one has that the present invention determines whether or not a subscriber line is usable **within the frequency range delimited by xDSL use, by measuring** a cross-talk noise characteristic of that subscriber telephone line **only within an xDSL transmission frequency band,** that noise characteristic being cross-talk existing on the subscriber telephone line due to interference from other subscriber telephone lines **within the xDSL transmission frequency band.**

Thus, the present invention focuses on the xDSL frequency band and not outside the xDSL frequency range.

Neither KOEMAN nor VALENTI '734 makes the teaching of measuring cross-talk existing on one subscriber telephone

line due to interference from other subscriber telephone lines **only within the xDSL transmission frequency band** in order to determine whether or not the subscriber line is usable **within the frequency range delimited by xDSL use**. Accordingly, the obviousness rejection is improper.

KOEMAN teaches to measure beyond the xDSL frequency, i.e., up to 100 MHz. KOEMAN makes no teaching to limit a cross-talk noise measurement to only with the xDSL transmission frequency range or to determine whether the line is usable within the frequency range delimited by xDSL use. This is because KOEMAN is not concerned the xDSL but is rather concerned with frequencies beyond xDSL.

Appellants understand that the Examiner agrees with appellants on this point.

On OA page 6, last paragraph, the Examiner acknowledges that KOEMAN teaches to measure a range beyond the frequency range delimited by xDSL, i.e., the Examiner states: "See Koeman et al's use a range of 1-100 MHz. See column 2, lines 56-63 indicating sampling at .15 and .25 MHz intervals over the range 1 MHz through 100 MHz."

Also in the last lines of the first paragraph of OA page 7, the Examiner states: "Therefore, Koeman frequencies of 0 to 100 MHz clearly fall within known xDSL frequencies range of 25 KHZ to 1.1 MHZ.".

Lastly, on OA page 3, the last paragraph, the

Examiner has stated that "The reason for Koeman not considering xDSL frequency range is that Koeman tester is to be used during installation phase enabling installers the ability to verify proper transmission performance … of wire pairs."

Thus, although KOEMAN teaches to test a range that includes the xDSL range, there is no teaching of limiting the measuring to only the xDSL range or to determine whether or not the subscriber line is usable within the frequency range delimited by xDSL use. Indeed, the KOEMAN teaching is contra to that recited, in that the teaching is to measure and evaluate well beyond the xDSL range, to 100 MHz.

However, again, on OA page 3, the last paragraph, the Examiner asserts that "Modifying Koeman tester to include testing for cross-talk after installation phase (i.e. in-service and/or testing) would only add flexibility to the tester as taught by Koeman."

First, measuring cross-talk within the limited xDSL frequency range is not disclosed by VALENTI '734. Further even if this were disclosed, there is no motivation for limiting KOEMAN to the xDSL range, other than impermissible hindsight.

Relevant to this point, the Federal Circuit emphasized in July, 1998 that "[m]ost, if not all, inventions are combinations and mostly of old elements." *In*

re Rouffett, 47 USPQ 2d 1453, 1457 citing to *Richdel, Inc. v. Sunspool Corp.*, 219 USPQ 8, 12 (Fed. Cir. 1983). The Federal Circuit continued by noting that "rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention itself as a blue print for piecing together elements in the prior art to defeat the patentability of the claimed invention."

Thus, the Federal Circuit requires that in order to prevent the use of such hindsight, the Examiner must "show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed." (*In re Rouffett* at 1458). The Examiner has not done this.

As stated by MPEP §706.02(j), to establish a *prima facie* case of obviousness the Examiner must first, consider the relevant teachings of the prior art, and after determining the differences between the pending claim and the prior art teachings, second, propose modifications of the prior art necessary to arrive at the claimed subject matter, ***explaining the motivation for combining the particular references and making the proposed modifications to those references.*** There is no viable motivation to modify KOEMAN as suggested by the Examiner.

Thus, even if measuring cross-talk within the limited xDSL frequency range were disclosed by VALENTI '734 (which it is not), the disclosure alone is not motivation for limiting KOEMAN to the xDSL range, and the rejection is improper.

What VALENTI '734 Does Disclose

In the last two lines of OA page 7, the Examiner states that VALENTI '734 "teaches a tester wherein a volt meter is used to determine if crosstalk exists on a bundled telephone cable (see at least the last two lines of paragraph 46)". But this "paragraph 46" is paragraph [0046] of the published application, which paragraph is not prior unless found in VALENTI '734.

To link this paragraph to VALENTI '734, the Examiner points to page 1, first paragraph and page 3, last 5 lines of VALENTI '734, said to reveal the same voltmeter being used. This is incorrect. Further, even if using a voltmeter is taught, measuring cross-talk within the limited xDSL frequency range is not disclosed by VALENTI '734.

The page 1, first paragraph reads "The present invention relates generally to the implementation and management of digital subscriber line (DSL) systems operating on copper twisted-pair telephone cables and, particularly, to an automated method and system for the

prediction and/or identification of crosstalk between pairs within a cable and the spectrum management of such systems".

The last 5 lines of page 3 reads "It is therefore an object of the present invention to overcome the deficiencies evident in the prior art in order to be able to take measurements in the DSL band and performing calculations with a centralized automated system to provide spectrum management. It is a further object of the present invention to provide for coordination of DSL systems for case-by-case spectrum management, provisioning, or maintenance."

These two passages do not disclose any voltmeter.

The Examiner has pointed to other parts of VANENTI '734. The second to last paragraph of page 5 is said to disclose a new "broadband test head" installed in the office to automatically and routinely provide current information on loop make-ups and crosstalk. Page 8, second full paragraph, is offered for teaching accounting for individual types of crosstalk sources or crosstalk couplings related to particular pair in a cable, and that a system that can characterize crosstalk on a loop-by-loop basis has a potential to yield a much more granular crosstalk characterization of the plant." The paragraph spanning pages 8-9, in discussing how a database to be used in the invention might be created, is offered as disclosing

measuring near-end crosstalk (NEXT) from an upstream ADSL source for a number of pair-to-pair combinations. These are compared against measurements of known sources for "source matching". Crosstalk is disclosed; voltmeter is not disclosed; measuring/evaluating limited xDSL frequency range is not disclosed.

VALENTI '734 fairly teaches measuring crosstalk. But see that the substantive VALENTI '734 disclosure is found on page 6, last paragraph, disclosing an approach used for deterring the loop make-up in the time-domain involving time domain reflections of special pulses sent out on the loops via the local metallic test bus. From this, it is clear that a simple voltage measurement is not being used and rather that is signal is being injected.

Thus, VALENTI '734 discloses neither using a volt meter to determine if crosstalk exists on a bundled telephone cable nor limiting a noise cross-talk measurement/evaluation to only the frequency range delimited by xDSL use.

In summary, VALENTI '734 fails to provide the features of the invention missing from KOEMAN or motivation to modify KOEMAN. The rejection as to claims 1 and 3 is therefore improper.

Arguments Concerning the Rejection of Claim 2

As noted above, claim 2 further recites "said measurement of the cross-talk is made without injecting a test signal onto the subscriber telephone line under test". As the invention measures voltage in order to measure cross-talk, no test signal need be injected.

KOEMAN discloses testing the quality of a LAN cable system by injecting a pulse signal and measuring a response signal so as to assess the quality of the LAN cable system in the frequency appropriate to LAN signals. See KOEMAN Figure 5 disclosing source signal generator 202 with pulse generator 206 providing a stimulus signal into the LAN cable system 14 and receiver 208 measuring the responsive signal.

Even if KOEMAN were modified to measure only in the xDSL range, KOEMAN would not satisfy the "without injecting a test signal" recitation.

The Examiner has not made a case for modifying KOEMAN to not include a injected pulse signal and therefore has not presented a *prima facia* case of obviousness.

In page 2 of the Advisory Action mailed September 19, 2005, the Examiner points to the paragraph of VALENTI '734 spanning pages 12-13 that list a number of possible options for measuring crosstalk. But the paragraph merely discloses that crosstalk could be measured in several ways,

and there is no enabling disclosure of measuring without injecting a test signal. Without an idea being enabled, the idea cannot be relied upon to render obvious the present invention. Further, even if there was enabled disclosure, the Examiner has not provided motivation as to why one of skill would so drastically modify KOEMAN.

What VALENTI '734 fairly teaches and enables is first stated at page 5, the second full paragraph, i.e., "a new 'broadband test head' [that] can be installed in the office that will automatically and routinely provide current information on loop make-ups and crosstalk. Using sophisticated signal processing and analysis approaches, we hope to be able to precisely determine loop make-ups for the entire nonloaded loop plant, including section lengths and bridged tap composition. The approach can be used to gather and characterize crosstalk for each of the loops."

Next VALENTI '734 page 6, last paragraph, disclosing that "The approach used for determining the loop make-up is in the time-domain. Special probing pulses are launched onto the loop via the local metallic test bus. …." VALENTI then goes on to disclose what can be done with resulting processed signals.

Although use of a broadband test head to access the loop and directly measure received crosstalk is mentioned in the sentence spanning VALENTI '734 pages 12-13,

this is the same broadband test head disclosed as being "new" and used with "special probing pulses". There is no disclosure, that is enabled, for the recited "said measurement of the cross-talk is made without injecting a test signal onto the subscriber telephone line under test".

The rejection as to claim 2 is therefore improper.

Arguments Concerning the Rejection of Independent Claim 17 and dependent claims 5 and 7.

As to claim 17, the focus is on the recitations "noise level measuring means for measuring an existing level of cross-talk noise on the subscriber line ascribable to first digital signal cross-talk noise within an overlapping frequency range of a first xDSL channel under test;" and "said noise level measuring means comprises a voltage measuring circuit for measuring an existing cross-talk noise voltage input via said relays [connecting to terminals of the telephone line],".

As discussed above, neither of KOEMAN and VALENTI '734 discloses "measuring an existing level of cross-talk noise … ascribable to first digital signal cross-talk noise within an overlapping frequency range of a first xDSL channel under test".

Thus, the rejection as to claim 17 is improper.

Also as discussed above, neither of KOEMAN and VALENTI '734 discloses "said noise level measuring means comprises a voltage measuring circuit for measuring an existing cross-talk noise voltage input via said relays [connecting to terminals of the telephone line],".

Thus, the rejection of to claims 5, 7, and 17 is improper.

Reversal of the obviousness rejection as to each claim is accordingly respectfully requested.

(viii) **Claims Appendix**

A copy of the claims involved in the appeal.

(ix) **Evidence Appendix**

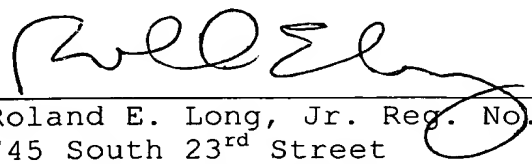
None.

(x) **Related Proceedings Appendix**

None.

Respectfully submitted,

YOUNG & THOMPSON



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(viii) **Claims Appendix**

1. (previously presented) A method of improving a transmission characteristic of an xDSL system that implements high-speed data communication over existing copper telephone line wires connecting a telephone office and a subscriber, comprising the steps of:

using a testing system installed in a telephone office proximate a main distribution frame polls, before connection of a subscriber telephone line to said xDSL system, said subscriber telephone line at an outside line of an xDSL circuit, to measure a cross-talk noise characteristic of said subscriber telephone line only within an xDSL transmission frequency band, and

if said cross-talk noise characteristic is of high level, preventing said subscriber telephone line from being connected to said xDSL circuit,

wherein the measured cross-talk characteristic is cross-talk existing on the subscriber telephone line due to interference from other subscriber telephone lines within the xDSL transmission frequency band.

2. (previously presented) The method as claimed in claim 1, wherein said testing system transforms a level of cross-talk noise on the subscriber telephone line to noise spectrum data by FFT (Fast Fourier Transform) and compares said noise spectrum data with a template for noise level decision, which is weighted at a subject frequency, to thereby determine whether or not said subscriber telephone line is usable, only within a frequency band for Direct Multi-Tone xDSL use, said measurement of the cross-talk is made without injecting a test signal onto the subscriber telephone line under test.

3. (previously presented) A system for measuring a transmission characteristic of an xDSL system that implements high-speed data communication over existing copper telephone line wires connecting a telephone office and a subscriber, said system comprising:

polling means included in an outside telephone line of an xDSL circuit installed in an office for polling a subscriber telephone line;

noise level measuring means for measuring an existing level of cross-talk noise on the subscriber line limited to an xDSL transmission frequency band; and

decision means for determining, based on the level of cross-talk noise measured, whether or not the subscriber

line is usable within the frequency range delimited by xDSL use.

4. (previously presented) The system as claimed in claim 3, wherein said polling means comprises:

an MDF (Main Distribution Frame) connected to terminals T and R of the outside line at a subscriber side; and

relays connected to said MDF and connecting the terminals T and R to test terminals.

5. (previously presented) The system as claimed in claim 4, wherein said noise level measuring means comprises:

a voltage measuring circuit for measuring an existing cross-talk noise voltage input via said relays;

an ADC (Analog-to-Digital Converter) circuit for converting cross-talk noise voltage measured to a digital signal; and

an FFT (Fast Fourier Transform) circuit for transforming the digital signal to noise spectrum data.

6. (previously presented) The system as claimed in claim 5, wherein said decision means comprises means for comparing the noise spectrum data with a template for noise level decision to thereby determining whether or not the subscriber line is usable within a frequency range for

Direct Multi-Tone xDSL use.

7. (previously presented) The system as claimed in claim 3, wherein said noise level measuring means comprises:

a voltage measuring circuit for measuring an existing cross-talk noise voltage input via said relays;

an ADC (Analog-to-Digital Converter) circuit for converting cross-talk noise voltage measured to a digital signal; and

an FFT (Fast Fourier Transform) circuit for transforming the digital signal to noise spectrum data.

8. (previously presented) The system as claimed in claim 7, wherein said decision means comprises means for comparing the noise spectrum data with a template for noise level decision to thereby determining whether or not the subscriber line is usable within a frequency range for xDSL use.

9-10. (cancelled).

11. (previously presented) The system of claim 3, wherein, the noise level measuring means for measuring an existing level of cross-talk noise on the subscriber line operates only above POTS frequencies.

12. (previously presented) The system of claim 3, wherein, the noise level measuring means for measuring an existing level of cross-talk noise on the subscriber line operates only above POTS frequencies.

13. (cancelled).

14. (previously presented) The method of claim 1, wherein the measured cross-talk characteristic is a cross-talk existing on the subscriber telephone line ascribable to interference from Integrated Services Digital Network.

15-16. (cancelled).

17. (previously presented) A system for measuring a transmission characteristic of an xDSL system that implements high-speed data communication over existing copper telephone line wires connecting a telephone office and a subscriber, said system comprising:

polling means included in an outside telephone line of an xDSL circuit installed in an office for polling a subscriber telephone line;

noise level measuring means for measuring an existing level of cross-talk noise on the subscriber line

ascribable to first digital signal cross-talk noise within an overlapping frequency range of a first xDSL channel under test; and

decision means for determining, based on the level of cross-talk noise measured, whether or not the first xDSL channel under test on the subscriber line is usable for xDSL transmission use, wherein,

said polling means comprises an MDF (Main Distribution Frame) connected to terminals T and R of the outside line at a subscriber side, and relays connected to said MDF and connecting the terminals T and R to test terminals, and

said noise level measuring means comprises a voltage measuring circuit for measuring an existing cross-talk noise voltage input via said relays, an ADC (Analog-to-Digital Converter) circuit for converting cross-talk noise voltage measured to a digital signal, and an FFT (Fast Fourier Transform) circuit for transforming the digital signal to noise spectrum data.

18. (previously presented) The system of claim 17, wherein the first digital signal cross-talk noise is ascribable to an Integrated Service Digital Network signal.

19. (previously presented) The system of claim 17,

wherein the first digital signal cross-talk noise is ascribable at least a second xDSL channel.

20. (previously presented) The system of claim 17, wherein,

the first digital signal cross-talk noise is ascribable to at least one of an Integrated Service Digital Network signal and a second xDSL channel.